Math 240 Summer 2014
Exam 1

Jun. 20, 2014

Student Name: _____

Instructor: _____

Class time: _____

	Score
1	
2	
3	
4	
5	
6	
Total	

Problem 1. (16 points) Solve the initial value problem:

$$\frac{dy}{dx} + y = x, \quad y(0) = 1$$

Problem 2. (16 points) Solve the initial value problem:

$$\frac{dy}{dx} = -\frac{\sin(x) + xy^2}{2 + x^2 y}, \quad y(0) = 1$$

You may leave your final answer in implicit form.

Problem 3. (16 points) Use change of variable to make the equation into a separable equation:

$$\frac{dy}{dx} = \frac{y - 9x}{x - y}$$

, You just need to write down the separable equation, but NO need to solve it.

Problem 4. (16 points)Find all the solutions of the differential equation:

$$x\frac{dy}{dx} + y = \frac{y-4}{1-y}$$

You may leave your final answer in implicit form.

Problem 5. (20 points) Find all solutions of the differential equation:

$$\frac{dy}{dx} + 2xy = e^{x^2} y^2$$

Problem 6. (16 points) Find and classify all the equilibrium solutions of the differential equation:

$$\frac{dy}{dx} = y^2 - 1$$

If $y(0) = -2$, then $\lim_{x \to +\infty} y =$?